

Waters ACQUITY UPLC SYSTEM †

ACQUITY UPLC BINARY SOLVENT MANAGER

Number of solvents	Up to four: in any combination of two: A1 or A2 and B1 or B2
Solvent storage	Solvents Tray accommodates up to four chromatographic solvents, two Sample Manager wash solvents and one Binary Solvent Manager seal wash solvent
Solvent conditioning	Vacuum degassing (six-channel): one channel per solvent, and two channels for Sample Manager wash solvents
Operating flow rate range	0.010 to 2.000 mL/min, in 0.001 mL increments
Compressibility compensation	Automatic and continuous
Effective system delay volume	< 120 μ L, independent of system backpressure (with standard 50- μ L mixer installed)
Plunger seal wash	Integral, active, programmable
Gradient profiles	Eleven gradient curves [including linear, step (2), concave (4), and convex (4)]
Wet prime	Automatic
Maximum operating pressure	15,000 psi up to 1 mL/min, 9,000 psi up to 2 mL/min per pump, not more than 15,000 psi total
Composition accuracy	\pm 0.5% absolute (full scale) from 5 to 95% of flow rates from 0.5 to 2.0 mL/min (Contact Waters for conditions used)
Composition precision	0.15% RSD or \pm 0.04 min SD, whichever is greater, based on retention time
Flow precision	0.075% RSD or \pm 0.02 min SD, six replicates, based on retention time or volumetric measures (0.500 to 2.000 mL/min)
Flow accuracy	\pm 1.0% at 0.5 mL/min with degassed methanol, per Waters AQT/SystemsQT protocol
Primary wetted materials	316 stainless steel, UHMWPE, sapphire, ruby, FEP, PTFE, ETFE, diamond-like coating, PEEK and PEEK alloys, titanium alloys
Unattended operation	Leak sensors, full diagnostic data captured through console software

ACQUITY UPLC SAMPLE MANAGER

Number of sample plates	Total of two plates, expandable to up to 22 plates with optional Sample Organizer (see below): <ul style="list-style-type: none">• 96 and 384 microtiter plates• 48 position 2.00-mL vial plates• 48 position 0.65-mL micro-centrifuge tube plates• 24 position 1.50-mL micro-centrifuge tube plates
Maximum sample capacity	768 in two 384-well plates; expandable to up to 8,448 samples with optional Sample Organizer (see below)
Number of sample injections	1 to 99 injections per sample
Injection volume range	0.1 to 50.0 μ L, in 0.1 μ L increments, partial or full loop mode, 10- μ L loop is standard; 1, 2, 5, 20, and 50- μ L loops also available
Sample delivery precision (full loop injection mode)	< 0.3% RSD, full loop, standard 10- μ L loop (default wash/purge conditions), per Waters AQT/SystemsQT protocol
Sample delivery precision (PLNO injection mode)	< 1% RSD within 20% to 75% of loop volume for 1, 2, 5, 10, 20, and 50- μ L loops, UV detection
Injector linearity	> 0.999 coefficient of deviation (from 20% to 75%, partial loop overfill mode (PLNO injection mode), per Waters' AQT/SystemsQT protocol

Sample temperature control	4.0 to 40.0 °C, settable in 0.1 °C increments (assumes an ambient temperature of 25.0 °C). At an ambient temperature of 21.0 °C or lower the sample manager will maintain the temperature of the sample compartment down to 4.0 °C with a tolerance of -2.0/+6.0 °C, when configured with the maximum number of vials and/or plates
Injection cycle time	< 15 sec between multiple injections with “load ahead” enabled 30 sec with single weak wash, 10-µL loop, pressure assist mode
Sample probe	XYZZ based needle-in-needle design
Minimum sample required	5 µL residual, using maximum recovery 2-mL vials (zero offset)
Wash solvents	Two degassed: strong solvent and weak wash solvent, programmable to suit application
Sample carryover	< 0.005% or < 2.000 nL, whichever is greater
Advanced operations	Loop off-line mode, load ahead
Unattended operation	Leak sensors, full diagnostic data control captured through console software
Primary wetted materials	Titanium alloy, 316 stainless steel, fluoropolymer, fluoroelastomer, PPS alloy, PEEK alloy, PPS, PEEK, DLC coating, gold
Column heater	Accommodates one column, 20 to 150 mm length x 1.0 to 4.6 mm internal diameter (I.D.), pivots out for use with optional MS detector
Column temperature control	5.0 °C above ambient to 90.0 °C settable in 0.1 °C increments
Column tracking	eCord™ Technology column information management tracks and archives usage history
Compartment temperature measurement accuracy	±1.0 °C
Compartment heating rate	Less than 15 min. 5.0 °C above ambient to 40.0 °C

ACQUITY UPLC INSTRUMENTAL CONTROL

External communications	Ethernet interfacing via RJ45 connection to host PC
Event inputs/outputs	Rear panel contact closure and/or TTL inputs/outputs
External control	Empower™ 1154 or 2154; or MassLynx™ Software or Empower network or standalone through console software
User diagnostics	Available through software on host PC; system control via console software
Connections INSIGHT®	Provides real-time monitoring and automatic notification of instrument performance and diagnostic information allowing for quicker problem resolution
ACQUITY UPLC Local Console Controller (LCC)	This controller mounts to the Sample Manager and communicates directly with the ACQUITY UPLC Console software application. The LCC monitors system and module functions can set initial conditions and run selected diagnostics. The LCC cannot create or edit instrument methods or acquire data.

ENVIRONMENTAL

Acoustic noise Operating	< 65 dBA
temperature range Operating	4.0 to 40.0 °C (39.2 to 104.0 °F)
humidity range	20% to 50%, non-condensing

POWER REQUIREMENTS

Voltage range	90 to 264 Vac
Frequency	47 to 63 Hz

PHYSICAL DIMENSIONS

Core ACQUITY UPLC System:	Width: 34.3 cm (13.5 in.)
Binary Solvent Manager, Sample Manager with Column Heater, and Solvents Tray	Height: 67.2 cm (26.5 in.) Depth: 71.1 cm (28.0 in.)

High capacity ACQUITY UPLC System: Binary Solvent Manager, Sample Manager with Column Heater, Solvents Tray, and Sample Organizer	Width: 58.40 cm (23.00 in.) Height: 92.70 cm (36.50 in.) Depth: 71.10 cm (28.00 in.)
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ACQUITY UPLC SAMPLE ORGANIZER (OPTIONAL)

Number of sample plates	Total of up to: <ul style="list-style-type: none">• 21 standard microtiter plates• 11 intermediate height plates• 7 deep-well (or 2-mL vial) plates• Combinations thereof
Maximum sample capacity	Total of up to 8,448 samples: in 22 384-well plates, or seven 336 2-mL vials
Temperature control	4 to 40 °C, settable in 1 °C increments
Plate exchange	< 15 sec (retrieval and replace time)
Sample temperature control	At ambient temperature of 21 °C or lower, the sample organizer will maintain the temperature of the sample compartment down to 4 °C with a tolerance of -2/+6 °C, when configured with the maximum number of vials and/or plates; for ambient temperatures above 21 °C, there is a delta of 17 °C from actual ambient temperature
Racks	10 storage shelf assemblies supplied standard

ORDERING INFORMATION

PART NUMBER

ACQUITY UPLC System (core)	176015000
ACQUITY UPLC Sample Organizer	186015020
ACQUITY UPLC Sample Organizer shelf	700002730
ACQUITY UPLC FlexCart	205015015

Waters SYNAPT G2-Si MS System

SYSTEM HARDWARE SPECIFICATIONS

Regulatory approvals/marks CE, CB, NRTL (CAN/US), RCM



PERFORMANCE SPECIFICATIONS

The SYNAPT G2-Si MS System operates in TOF mode and can be upgraded on site to provide Mobility-TOF mode

TOF mass resolution in positive ion	60,000 FWHM measured on the $(M + 6H)^{6+}$ isotope cluster from bovine insulin (m/z 956)
TOF mass resolution in negative ion	60,000 FWHM measured on the $(M - 4H)^{4-}$ isotope cluster from bovine insulin (m/z 1431)
Positive ion MS sensitivity	<p>The peak at m/z 556 from a solution of 50 pg/μL leucine enkephalin in 50/50 acetonitrile/water +0.1% formic acid, infused at a flow rate of 5 μL/min, will have an intensity of greater than 31,200 ions per second. The instrument will be tuned to 10,000 resolution (as demonstrated on bovine insulin) and the mass range will be set to a maximum of 1200 m/z</p> <p>Target Enhancement mode</p> <p>The peak at m/z 556 from a solution of 10 pg/μL leucine enkephalin in 50/50 acetonitrile/water +0.1% formic acid, infused at a flow rate of 5 μL/min, will have an intensity of greater than 24,800 ions per second. The instrument will be tuned to 20,000 resolution (as demonstrated on bovine insulin), with sensitivity set to a maximum at 556 m/z</p>
Negative ion MS sensitivity	<p>The peak at m/z 503 from a solution of 500 pg/μL raffinose in 70/30 acetonitrile/water (no additives), infused at a flow rate of 5 μL/min, will have an intensity of greater than 33,600 ions per second. The instrument will be tuned to 10,000 resolution (as demonstrated on bovine insulin), and the mass range will be set to a maximum of 1200 m/z</p>
Positive ion MS/MS sensitivity	<p>Using a [Glu¹]-Fibrinopeptide B solution of 100 fmol/μL, at a flow rate of 5 μL/min and with the instrument tuned for 10,000 resolution (as demonstrated on bovine insulin), the intensity of the most intense y^n sequence ion from the MS/MS spectrum of the doubly charged precursor ion (785.8 m/z) will be greater than 2,400 ions per second. The instrument mass range will be set to a maximum of 2000 m/z</p>
Negative ion MS/MS sensitivity	<p>Using a solution of 500 pg/μL raffinose in 70/30 acetonitrile/water, at a flow rate of 5 μL/min and with the instrument tuned for 10,000 resolution (as demonstrated on bovine insulin), the intensity of the fragment ion at 179.1 m/z in the MS/MS spectrum of the precursor ion at 503.2 m/z will be greater than 2,400 ions per second. The instrument mass range will be set to a maximum of 1200 m/z</p>
Mass scale calibration accuracy	<p>The mass measurement accuracy of the instrument in High Resolution mode, using internal lock masses, is such that the RMS error between the measured and the accepted masses of peaks which have sufficient intensity, and are free from interference from other masses, will be less than 1 ppm over the range 150 to 900 m/z</p>
Mass measurement accuracy	<p>The mass measurement accuracy of the instrument, in High Resolution mode, will be better than 1 ppm RMS, based on 10 consecutive repeat measurements of the $[M + Na]^+$ ion of raffinose (m/z 527.1588), using the $[M + H]^+$ ions of leucine enkephalin (m/z 556.2771) and 4-acetamidophenol (m/z 152.0712) as the LockSpray™ lockmasses. Analyte and lockmass peaks must have sufficient intensity and be free of interference from other masses</p>
Mass range	<p>The TOF mass range is 20 to 100,000 m/z in Resolution mode, and 20 to 32,000 m/z in High Resolution mode. The m/z transmission range for a quadrupole in non-resolving mode is 20 to 16,000 m/z for a 4000 m/z quadrupole, and 20 to 32,000 m/z for an 8000 m/z quadrupole</p>
Acquisition rate	<p>Mass spectra can be acquired up to a rate of 30 per second (mode dependent)</p>
Dynamic range	<p>The dynamic range in High Resolution mode, defined as the range of peak intensities that will give better than 3 ppm accurate mass RMS for 10 sec of data without pDRE (programmable Dynamic Range Enhancement), is at least 4 orders of magnitude, when measured on the m/z 556.2771 peak from leucine enkephalin</p>
High mass precursor selection	<p>Applicable to instruments with 8000 m/z and 32,000 m/z quadrupoles only</p> <p>The low energy MS/MS spectrum of m/z 5569.1 from a solution of 2 μg/μL sodium iodide in 50/50 isopropanol/water will contain only m/z 5569.1 and its fragments. The intensity of the largest fragment ion will be less than 5% of the intensity of the precursor ion. MS/MS data will be acquired over the mass range 100 – 8000 m/z, with collision energy of 10 eV</p>